

## The MINES of ARIZONA

This department is under the direction of Mr. W. E. Defty, who will carefully scrutinize all matters relating to mining in order that only reliable information regarding legitimate enterprises shall find a place here.

The Republic would be pleased to receive information from any part of the state regarding the development of the mining industry. All communications should be addressed: Mining Department Arizona Republican.

### Arizona Mines

The mines and smelters of Arizona have been working at a pressure so high in 1916 that they are probably making record productions of all metals. If they continue to work at the present rate during the year they will make an output of over 600,000,000 pounds of copper, against about 450,000,000 in 1915, according to reports received by the U. S. Geological Survey by Victor C. Helges of the Salt Lake office.

A corresponding increase in the output of the precious metals and an increase in that of lead and zinc, which is probable, will, at the greatly increased prices, make the total value of the output in 1916 nearly double that of 1915, which was about \$88,000,000. Thus Arizona not only retains first place as a copper producer, but is producing at a rate nearly double that of any other state.

Aside from a general effort to take advantage of an unusually active market, several factors have aided this increase, such as the settlement of the strike at the Clifton-Morenci mines in January. The International smelter, which treats Inspiration ore, contributes the greatest part of the increase, for this plant is supplying about one-fourth of the total copper.

Marked increases and improvements were made at the United Verde, Miami, Calumet and Arizona, and Old Dominion mines, and the Sisco plant in Pima County was again blown in. The railroad to Ajo was completed and work has been begun there on a 4,000-ton leaching plant.

There is great activity in the production of gold, especially in Mohave County, and the high price of zinc has stimulated production at the Tennessee, Union Basin and Kingman zinc properties. The mill at the Union Basin mine was enlarged, and work at the San Xavier mine in Pima County was resumed.

### Miami

There is a feeling that as Miami did not increase the dividend rate for the August payment, stockholders may later on get something in the way of an extra dividend. The earnings of the company during the first six months are estimated at nearly \$4,000,000 on the basis of an output of 25,000,000 pounds of the metal and with prices averaging near the present level. The output for the second six months of the year is expected to be larger and prices should average about the same so that for the year it is estimated that Miami will earn something like \$12 per share. The company is under-

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Size	Plain Treads	Gray	Red
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30x3	..... 6.95	1.85	2.10
30x3 1/2	..... 8.95	2.10	2.35
31x3 1/2	..... 9.45	2.15	2.40
32x3 1/2	..... 9.95	2.25	2.45
32x3 1/2	..... 10.95	2.30	2.55
36x3 1/2	..... 12.05	2.40	2.75
30x4	..... 13.20	2.80	3.10
31x4	..... 13.85	2.85	3.20
32x4	..... 14.05	2.95	3.30
33x4	..... 14.70	3.10	3.40
34x4	..... 14.95	3.15	3.50
35x4	..... 15.65	3.20	3.60
36x4	..... 15.85	3.30	3.70
34x4 1/2	..... 20.25	3.85	4.30
35x4 1/2	..... 20.85	3.95	4.35
36x4 1/2	..... 21.25	4.10	4.50
37x4 1/2	..... 21.90	4.15	4.60
36x5	..... 23.65	4.70	5.20
36x5 1/2	..... 23.95	4.90	5.35
37x5	..... 24.90	4.95	5.45

NON-SKID PRICES IN PROPORTION

Prices Subject to Change Without Notice

**Automobile Tire Co.**  
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The Oldest Automobile Tire Jobbing Concern in the United States and the largest in the world.

stood to have accumulated a cash surplus of nearly \$5,000,000.

### United Verde Extension

United Verde Extension Mining Co. reports lower earnings and higher costs than many recent newspaper and brokers' accounts had intimated. The public into believing. The company reports \$793,832 cash on hand as of July 1 represents six months' profits on ore already shipped, but not yet paid for, a total of \$1,793,832. On January 1, 1916, the cash assets were \$501,811. The increase of \$1,292,000 between January 1 and July 1 represents six months' profits, which are at the rate of approximately \$2.50 per share per annum. The production of copper in the six months is estimated at 10,500,000 pounds net, and the profit 12.3c per pound. As the price of refined copper in New York during the six months averaged around 26.5c according to the official "Engineering & Mining Journal," the indicated costs of production was 14.2c per pound. According to various brokers' and press accounts the company was producing copper at a cost of from 7c to 9c per pound. It must, however, be added that costs in the six months past have been abnormally high wages, but also to an abnormally amount of new development work in opening up this young mine. Doubtless, too, the ultimate erection of a smelter by the company will effect a very considerable saving in costs per pound. Examples of the Chalcoite ore now being shipped by the U. V. Co. can be seen at the local assay office, 307 N. First street.

### Shannon Copper

The Shannon Copper Co. reports an output of 1,000,000 pounds in June which compares with 1,072,000 pounds in May, 982,000 pounds in April and 682,000 pounds in March.

### Democratic Blessings For the Mining Industry

Will curtail production. Probably close down many of the low grades.

Reduces employment of labor and cuts down wages.

The only thing the government leaves untaxed is the back of copper. The new revenue bill which imposes a tax on minerals and copper metal has the following to say regarding copper (Section 202):

"Every person smelting copper ore, refining metallic copper, or alloying copper, shall pay for each taxable year an excise tax equivalent to the following percentages of the gross:

"Receipts during such year from the sale or disposition of refined copper or copper alloys and from the sale or disposition of crude or unrefined copper if sold or disposed of for any purpose except for refining or alloying:

"One per centum of the amount by which such receipts exceed \$25,000 and do not exceed \$1,000,000.

"Two per centum of the amount by which such receipts exceed \$1,000,000 and do not exceed \$10,000,000 and

"Three per centum of the amount by which such receipts exceed \$10,000,000."

In brief the proposed tax amounts to 1 per cent of the gross value of the copper metal sold into consumption up to \$1,000,000; 2 per cent on the gross value above \$1,000,000, and up to \$10,000,000, and 3 per cent of the gross value above \$10,000,000.

The tax is described as an excise tax designed for the temporary needs of the government at the present time in connection with the Mexican disturbance. Unfortunately those familiar with government taxation have a lurking suspicion or fear that the tax may endure long after the conditions which brought it into being are gone and forgotten. This is a habit of government taxes. They are seldom if ever repealed, and we have had the Mexican disturbance for years and there is no reason to presume that it went last as long as the present regime is in office.

### Demand for Quicksilver

The domestic quicksilver industry has continued active during the first six months of 1916, and the average price for the period has been about double the exceptionally high average for the entire year 1915.

Figures just compiled by the United States Geological Survey show that the total production of quicksilver in the United States in 1915 was 1,232 flasks of 75 pounds each, having a market value of \$1,826,192, or an average of \$86.86 per flask. Of this output 14,283 flasks, selling for \$1,174,881, came from California and the remainder almost entirely from Texas and Nevada. The actual average sales value for the whole country exceeded the average market value in San Francisco, which was \$85.80 for the year. In 1914 the domestic output was 16,548 flasks, valued at \$1,118,680, and therefore the production for 1915 showed an increase of over 27 per cent in quantity and 125 per cent in value.

The increased domestic demand for quicksilver in the last 15 months has been due mainly to war requirements for fumigants and drugs. Early in 1915 domestic stocks began to be drawn upon and production became more active, but as foreign embargoes left the field clear and domestic output was unable to meet the rapidly increasing call for the metal, prices continued to rise throughout the year and into the early months of 1916, the high mark of \$390 a flask being passed in February. Naturally every market and prospect became of interest.

The relation of net in, however, as the high prices drew out quicksilver supplies in Mexico and elsewhere that had been originally purchased for amalgamation of gold and silver ores, and finally as the British government permitted exports to America under certain limitations. The average monthly domestic price in San Francisco, which had climbed from \$51.90 in January, 1915, to \$295 in February, 1916, dropped to \$219 in March, \$141.60 in April, \$90 in May and about \$72 in June.

The market remains steady and in general highly profitable, and as domestic prices have dropped below London quotations experts rather than imports of the metal may be expected. There is probably no great quantity of metal stored, and consumption is undoubtedly abnormally large. Favorable markets have brought out great activity in search for new prospects, and discoveries near Morton,

Wash., and Beagle, Ore., in 1916 have led to some development and construction of reduction plants. Also in the Skull Valley deposits, Ariz., referred to many years ago by W. P. Blake and at Black Pine, Idaho, some activity is reported. Many old furnaces have been repaired or enlarged in California, Nevada, and Texas, old workings have been reopened, and new discoveries have been developed.

Very likely the exceptionally high prices of the last few months have led to gouging and robbing many mines of their best ore, and the average tenor of the ore worked by the larger mines during the first half of 1916 may prove considerably below that of previous years. Moreover, some mines have undoubtedly passed their maximum productivity.

These conditions are probably offset to some extent by the fact that the furnace capacity is now working on quicksilver ores than at any previous time in the history of the industry. On the whole the midyear outlook is for an output in 1916 fully equal to that of 1915.

### THE MOTOR-TRUCK IN ARIZONA

(By Wilbert G. McBride)

"Two Alco 2 1/2-ton motor-trucks used by Young Bros. while operating at the Mammoth Collins mine at Shultz, Arizona. One was equipped with an oil-tank holding 167.5 gal. and was used for the transportation of 'tops.' The other was fitted with a stake body and used to carry machinery, wood, rails, pipe, and all classes of miscellaneous supplies. The bodies were made of oak with maple flooring and were attached to the frame of the chassis by U-bolts, to avoid drilling the main members of the frame.

Most of the hauling was done from Tucson, a distance of 47 1/2 miles. During the first three months, part of the road was in bad condition and the tire cost was excessive. After this part was repaired, the road was in fair condition, but never good. There were no excessive grades or bad sand, but wagon-ruts too narrow for the truck-wheels and of a different gauge, caused heavy tire loss; while chuck-holes, sharp curves, and stones, both imbedded and loose, were objectionable features. During wet weather the trucks could not get sufficient traction to climb some of the hills and were likely to stick in the mud, so that no attempt was made to run them unless they were on the road when the rain started. This lost time amounted to about 5 per cent of the total, but, whenever possible, it was utilized in making minor repairs.

The price of gasoline was from 17 to 21c per gal. Rubber tires were used throughout. Drivers were paid \$4.50 to \$5 per shift, and a return trip to Tucson was counted as two shifts even when made in one day. Drivers were provided with a room in Tucson and were paid for all time lost due to causes beyond their control. Trucks were loaded one way only.

Speedometers were placed on both trucks, but the excessive vibration soon caused them to fail. For this reason, and because no account was taken of the distance covered in picking up a miscellaneous load or in other minor ways, the mileage given in the actual distance traveled. Some of the weights had to be estimated, but care was taken to have the number of ton-miles low rather than high, to avoid under-estimating the costs. The cost of hauling from Tucson to the mines was 12c per ton with the trucks, while the best possible team price was \$15. Teams made one return trip a week, while the truck regularly made one in two days and could always, and many times did, do it in one day. The loss of time due to wet weather would be about half as much with teams as with trucks.

The table of detailed costs given below covered the period from August 21, 1913, to August 15, 1914, the only time in which the trucks were continuously employed. From August 15, 1914, to March 30, 1916, the trucks were used intermittently, but the figures for this period have been excluded as not being representative. If included, they would lower the cost per ton-mile. Just prior to the close of the period covered by the figures, the trucks were overhauled and put in good condition; new rear-wheels were put on and new tires substituted. The cost of all this was charged to operation. Allowances for extra tires on hand would reduce the cost per ton-mile approximately 3/4c, leaving a net cost of about 25c. With loads on the return-trip this cost per ton-mile would be lowered at least 40 per cent.

### Operating Data

Total distance traveled by trucks..... 32,000 miles  
Total work done by trucks..... 42,700 ton-miles  
Average distance covered per gallon of gasoline..... 4.5 miles  
Average distance per gallon of lubricating oil..... 128 miles  
Average speed, loaded, 7 miles per hour  
Average speed, light..... 7.5 miles per hour  
Details of Cost

Wages of drivers.....	\$2,633.22	23.91	\$0.1141	\$0.0614
Wages of helpers.....	286.50	2.62	0.0125	0.0067
Repairs, labor.....	581.74	5.30	0.0253	0.0136
Repairs, lost time.....	156.15	1.42	0.0068	0.0037
Oils, grease, and waste.....	172.17	1.57	0.0165	0.0089
Gasoline.....	1,510.49	14.68	0.0700	0.0377
Tires.....	2,445.75	22.30	0.1063	0.0572
New parts.....	515.08	4.69	0.0224	0.0121
Miscellaneous supplies.....	348.82	3.18	0.0152	0.0082
Incidental expense.....	226.21	2.06	0.0098	0.0052
Depreciation.....	1,796.80	16.38	0.0781	0.0421
Total.....	\$10,970.03	100.00	\$0.4770	\$0.2570

The advantage of the motor-truck over the team wagon are many—increased speed, ability to work 24 hours per day when necessary, and lower cost on long hauls—but its adoption by the mining industry has been slow. Where trucks are used around mines they are usually driven by cheap inexperienced men, the upkeep and repairs being turned over to the regular mine mechanics. It would be equally good practice to employ a timber-framer to make a dining-room table. Just as the niceties of cabinet-making are unknown to the timber-framer, the exact adjustments and fine workmanship of the high-speed engine and transmission-gears of a motor-truck are beyond the ken of the mine mechanic, one of the least skilled of his class. If there are enough motor-vehicles at the mine, the master mechanic probably turns over the work to one or two men who, in time, become indifferent auto-mechanics, but in the meantime the cost of maintain-

ance soars and often the trucks are condemned. The aim of the makers of all motor-vehicles is to secure the maximum of strength and power with a minimum of weight and size. To do this, high-speed engines, the best of materials, and the finest of workmanship are employed, and parts are reduced to the least possible weight consistent with strength and durability.

This is just the reverse of the ordinary American mechanical practice, which reliability is secured by slow speed and large size, the amount of material used and the space occupied being minor considerations. It is, therefore, unreasonable to expect the mechanic trained in one school to understand immediately and adapt himself to the ways of the other. It must also be remembered that no other machine is given the hard use and necessary abuse that motor-trucks receive. The vibration while on the road will loosen nuts and rivets, and this, if not attended to in time, will cause serious trouble. Where only one or two trucks are used, the drivers should be competent mechanics and should be held responsible for the maintenance of their machines. Where several are used, they should be under the direct supervision of a thorough truck-mechanic that is held responsible for operation and given entire control of the drivers and repair-work. His constant care will detect and remedy many incipient defects and prevent expensive and annoying break-downs. With the exception of the time required for periodic overhauling, he should be able to keep the trucks in almost continuous service. This will make possible the employment of cheaper drivers without undue damage to the machines.

Motor-trucks should not be installed without careful consideration of the roads to be traveled. The difference between the cost of motor-truck and team-hauling is largely controlled by the quality of the road, and on really bad roads the motor-truck is decidedly the more expensive. Many roads are fatal to truck-haulage, and considerable experience is required to decide this question without an actual test of some duration. Excessive grades are to be avoided, especially long ones. The ordinary truck will pull over a short 20 per cent grade with ease, but will give great trouble on a long one of half that rise unless special cooling arrangements are made. Grades greatly increase the tire and gasoline consumption and decrease the life of the machine. Rocky roads, particularly when the rocks are sharp or loose, are hard on tires. Deep sand is difficult to cross, and for this class of road the caterpillar tractor and the four-wheel-drive truck have distinct advantages. Trucks that drive on the rear wheels only cannot operate in heavy sand. Narrow or rutted roads are objectionable for the larger-sized trucks because they throw all the weight on one of the rear dual-tires from time to time, and this over-loading is injurious to the rubber. Fairly deep streams can be crossed, but mud is an absolute barrier except to the caterpillar type of tractor. Few dirt-roads will stand up under a 7-ton truck, but those of 4 tons, or under, do less damage than the ordinary freight-wagon. Unfortunately, trucks are not designed to suit mining conditions. At Shultz we found it necessary to cut down the gear ratio, increase the size of the wheels and tires, and add bumper or auxiliary springs. Had the grades been steeper it would have been necessary to increase the cooling capacity.

For long hauls the motor-tractor will probably replace the motor-truck. It will operate at a lower cost because the load will be carried on iron tires, and as the latter of detailed cost shows, the rubber tires account for 22.2 per cent of the total. Tractors travel more slowly than motor-trucks, but the tonnage hauled on a trip is much greater. They are also easier on roads, as the load is distributed over several trailers. By using extra trailers, loading and unloading can be done on the road.

The make of a truck is not so important as the care it receives. Almost any standard make will do good work if given careful attention, but none will be satisfactory if not well cared for. Economy should not be sought in the lubricants used; the best oil is none too good. Overloading should be scrupulously avoided. A truck may be made to carry many times its rated load without breaking down, but the damage is none the less real and accumulates appreciably. High speed, particularly if the road is rough should be avoided, since it subjects the machine to excessive strain and vibration. Most trucks are now equipped with speed-governors, but these are easily tampered with and must be carefully watched. When they are not used, the drivers should be carefully instructed as to the speed limit and compelled to respect them. Distillate and "tops" are now successfully used on trucks, by the application of a special carburetor. The use of these should effect a material saving in the gasoline cost, which now amounts to almost 15 per cent of the total. "Tops" usually sells for 30

to 35 per cent and distillate for 50 to 60 per cent of the price of gasoline. With a properly designed carburetor, the available power in the lower-grade fuel will be about the same as in the gasoline, but the carbon deposition will probably be somewhat greater.	
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A paper to be read before the Arizona September 1916 meeting of the American Institute of Mining Engineers.

### FINANCES and MARKETS

(Continued from Page Four)

Magma Copper.....	13 1/4	14
Massachusetts Consol.....	11 1/2	12
Miami.....	33 1/2	34 1/2
Mohawk.....	81	81 1/2
Nevada Consolidated.....	14	16 1/2

# Foos Junior

## Gas and Gasoline Engines in

2, 4, 6 and 8 horsepower deliver a full equivalent of horse power for every dollar of the purchase price. The simple design of the FOOS JUNIOR does not affect its high quality. Their crank shafts are made from open hearth steel forgings machined and ground to exact size. The cylinders and pistons are accurately finished on special machines; the cam gears and pinions are machine cut. The purchaser is furnished with a record of each engine on the testing floor, signed by the oldest exclusive American Gas Engine Factory in existence. The man who buys a 2 1/4-4 or 8 H. P. FOOS JUNIOR gets the same proof of horsepower as the purchaser of a 250 horsepower FOOS VERTICAL. Each engine is handsomely painted and finished.

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# DUNDEE

The Best Speculative Buy

You probably had your opportunity to get United Verde Extension stock at a lower figure—and turned it down. Dundee offers the best speculative chance to repeat the phenomenal profits of Extension now on the market. The possibilities of the territory lying to the east and south of the ground where the Bonanza ore body was encountered are undoubtedly as good as those in which the Bonanza orebody was found. Engineers report that the trend in the direction of the Dundee ground, 1000 feet away, which straddles the famous North fault where the richest orebodies of the Clark and Extension mines have been found. The shaft is 291 feet down, working three shifts, and doing five feet a day. Another shaft is working on the rich zone of carbonate ore encountered at the 65 ft. level, taking the ore out through the tunnel. It is estimated that the blanket of carbonate ore overlying the entire property will return the capitalization of Dundee with the prospects of the rich sulphate ore at depths to give phenomenal value—the same ore body in Dundee as found in Extension would make Dundee stock at least twice the value of Extension stock because it has one half less shares outstanding capitalization. Better get in Dundee now while the midsummer stock market depression is on and prices are down.

### R. Allyn Lewis

Correspondent E. F. Hutton & Co., Members New York Stock Exchange  
Private leased wire to all Exchanges

### MARKET NEWS

By R. Allyn Lewis

There is some foreign selling of rails appearing in this market. Pennsylvania is especially referred to. A large reduction in loans is expected in well informed quarters to be reported during the next two weeks by the New York institutions which are reported to have made extensive readjustments in connection with the New York curb market in the past ten days.

As soon as the French loan is completed, easing tendencies in the money market are expected. There is no doubt among Wall Street bankers, however, that the cost of capital has started to rise.

Rallying tendencies of an irregular character are expected. Advances received from many parts of the speculative community. The highest grade of buying is found in standard rails the purchase of which we recommend during market heaviness.

The industrial liquidation is not completed according to our observation. Coppers are in the same category temporarily but to a lesser degree.

It should be remembered that the Santa Fe of 1895-96 when it went into the hands of a receiver and was reorganized had a poor apology of a road bed compared with Rock Island of the present day. It also served a very sparsely populated territory and its physical value was very small in comparison with that of Rock Island today. Arizona, the largest producer of copper in the world, has profited wonderfully in the last two years which is also true of other states served by the Rock Island. Likewise the Rock Island's terminal in Chicago is almost priceless. No other western road has any such connection with the east. When one reflects that the present Rock Island carried a burden of bonds and stocks of over two hundred million dollars for the defunct Rock Island company all of which has vanished into thin air, the possibilities are exceed-

ingly interesting.  
DUNDEE-ARIZONA—Mr. W. E. Defty, consulting engineer, in his report of July 19, states that the shaft has been sunk to a depth of 291 feet or 75 feet for the month, their workings being fully timbered to within 16 feet of the bottom of the shaft; the ground encountered in sinking was mostly blue lime intensely fractured. Three shifts of men are engaged in sinking the shaft and Mr. Defty anticipates that they will obtain a depth of 5 feet daily including timbering. One shift of men has been started on the 65-foot level drifting on the conglomerate ore to the west. He further states that all the conditions at the property are very satisfactory.

Printed sales Inspiration Needles today \$800 at 50c, 3600 at 51c, 1100 at 52c, 2900 at 53c.  
New York Bank Statement  
Loans: Decrease, \$55,290,000.  
Demand deposits: Decrease, \$60,317,000.  
Time deposits: Increase, \$1,769,000.  
Reserve: Increase, \$10,392,130.  
Actual

CORN—Hot weather scare and claim of corn firing started general stampede among shorts in December. Other months up in sympathy. Forecast for continued heat over Sunday. Cash sales, 20,000.

OATS—Oats market higher with other grains influenced by improved export call. Down-state reports continued to reiterate claims of loss in weight account recent intense heat. Cash sales 480,000 including 340,000 for export.

PROVISIONS—Provisions inactive, poor support. British and French government's inquiring for provisions.

## FEDERAL MINE DEVELOPMENT CO.

HERBERT B. ATHA, President.

This company has been formed to take over and develop good mining prospects, not to sell stock, and would be pleased to have any worthy properties called to its attention.

Office 205 Fleming Bldg, Phoenix